

ABSTRACT

The main purpose of this project was to develop and implement a wastewater sampling and laboratory analysis program to obtain baseline information regarding the quality of the wastewater in the collection system of the City of Ensenada, Baja California, Mexico. In addition, the project involved the training of personnel from the Comisión Estatal de Servicios Públicos de Ensenada (CESPE) in wastewater sampling techniques and the transfer of wastewater sampling equipment. CESPE and Baja California's Autonomous University in Ensenada analyzed some of the samples for the parameters for which they have laboratory capabilities to obtain data for laboratory comparison studies. A total of twenty-three sampling events were conducted, at four sites per event, representing a total of seventeen different sampling locations. The results of the analyses are consistent with a wastewater of medium strength, normal for the volume of water use per capita in Ensenada. pH and conductivity measurements showed a high degree of variability and extreme values in some parts of the City.



INTRODUCTION

The purpose of the project was to sample and analyze wastewater throughout the collection system in Ensenada to obtain baseline data to be used in support of wastewater operations and the industrial wastewater discharge control program. Training in wastewater sampling was provided to CESPE personnel and wastewater sampling equipment was issued in order to provide CESPE with the capability to continue sampling after the end of this project.

CESPE conducts routine monitoring only at the wastewater treatment plants and their laboratory analytical capabilities are limited. This project expanded the sampling into different parts of the City and the laboratory analyses included additional pollutants of concern such as cyanide, metals, pesticides, volatile and semivolatile organic compounds.

METHODS

The general sampling plan, including the initial sampling sites and schedule, was developed by a Technical Committee with representatives from CESPE, Baja California's Department of Ecology, Baja California's Autonomous University, Baja California's State Water Commission, California's Environmental Protection Agency, California State Water Resources Control Board, San Diego State University Foundation and the City of San Diego. CESPE selected additional sampling sites as the program progressed and laboratory data became available.

The sampling activities involved setting-up and programming automatic samplers one day, and collecting the samples the next day. The schedule was set to start a sampling event every eight days, so that all days of the week would be represented after seven sampling events. A total of twenty-three sampling events were conducted, collecting four samples per event at a total of seventeen different sites. City of San Diego personnel performed all of the sampling activities at first, while training personnel from CESPE. Gradually CESPE took over the sampling and delivered the samples to City of San Diego personnel at a specified location in Tijuana, Baja California.

The laboratory analyses were performed by the City of San Diego's Industrial Waste Laboratory. The laboratory is certified for the specific tests performed in this project by the Environmental Laboratory Accreditation Program of the State of California's Department of Health Services, Certificate No. 1985. The laboratory followed its standard quality assurance and quality control procedures established to comply with the requirements of the accreditation program.

Samples were collected as grabs or as 24-hr composites. Grab samples only represent the moment at sample collection, but are required to preserve some parameters for laboratory analysis. 24-hr composites are prepared by programming the automatic sampler to collect a sample every fifteen minutes and to switch to the next bottle after every hour.

Conductivity and pH are determined for each of the twenty-four bottles and a composite is made for laboratory analyses.

The laboratory analytical methods are summarized in the following table:

Parameter	Analytical Method	Sample Type	Ref.
Total Suspended Solids	EPA 160.2	24-hr composite	1
Ammonia-Nitrogen	EPA 350.3	24-hr composite	1
Cyanide: amenable	EPA 335.1	Grab	1
Total	EPA 335.2	Grab	1
Biochemical Oxygen Demand	EPA 405.1	24-hr composite	1
Chemical Oxygen Demand	EPA 410.4	24-hr composite	1
Hexane Extractable Material (HEM)	EPA 1664	Grab	2
HEM-Silica Gel Treated	EPA 1664	Grab	2
Methylene Blue Active Substances	EPA 425.1	24-hr composite	1
Organophosphorous Pesticides	EPA 614	Grab	3
Organochlorine Pesticides & PCB	EPA 608	Grab	3
Volatile Organic Compounds	EPA 624	Grab	3
Semivolatile Organic Compounds	EPA 625	Grab	3
Metals	EPA 200.8	24-hr composite	4

1. Methods for Chemical Analysis of Water and Wastewater, EPA-600/4-79-020, revised March 1983 and EPA-600/4-84-017, March 1984.
2. Environmental Protection Agency, EPA-821-R-98-002, February 1999.
3. Methods for Organic Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057, July 1982.
4. Methods for the Determination of Metals in Environmental Samples-Supplement I, EPA/600/R-94/111, May 1994.

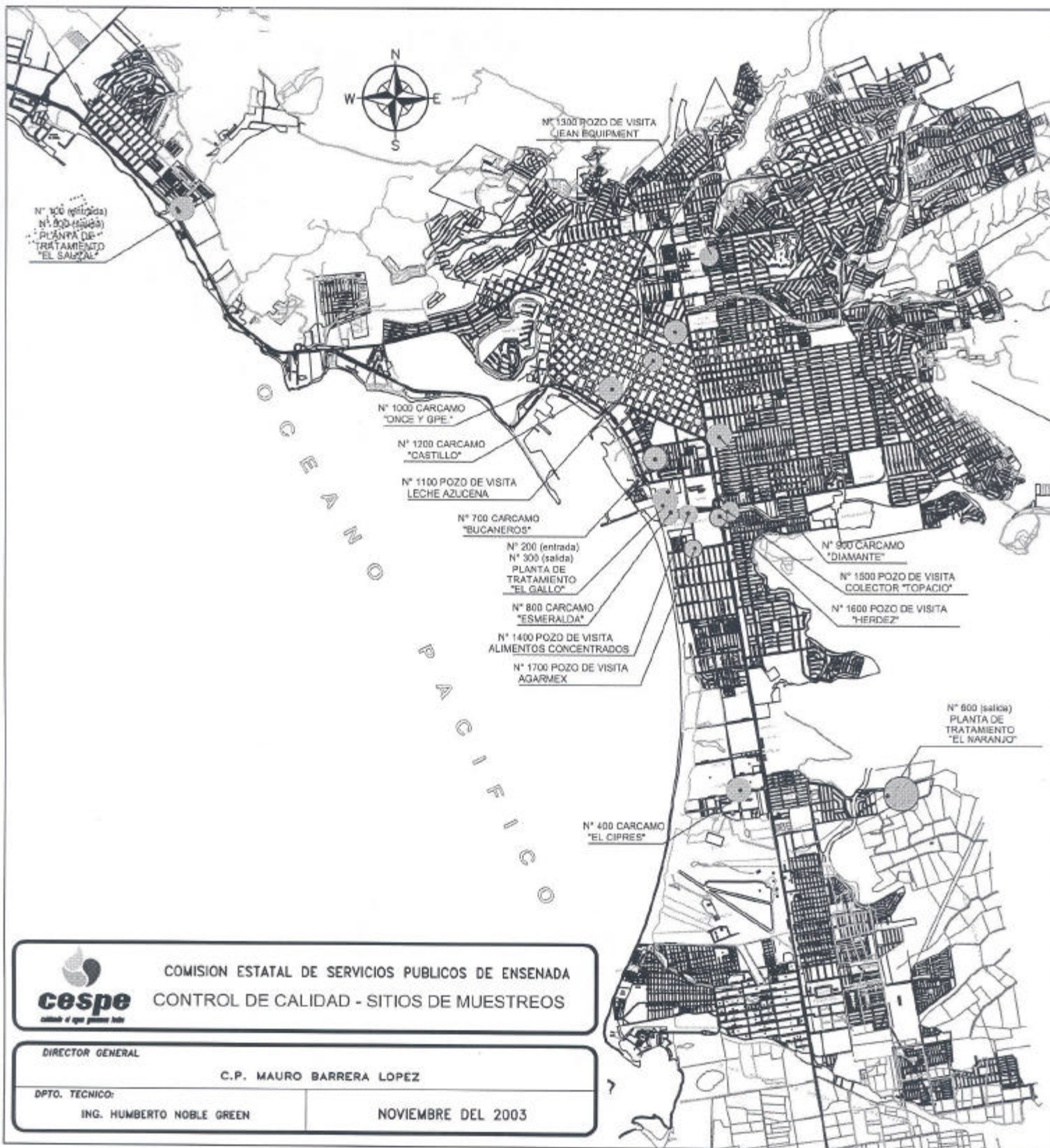


SAMPLING LOCATIONS

The names and descriptions of the sampling sites are given in the following table (see map on next page):

SITE #	NAME	DESCRIPTION
100	ENTRADA SAUZAL	“El Sauzal” Wastewater Treatment Plant influent
200	ENTRADA GALLO	“El Gallo” Wastewater Treatment Plant influent
300	SALIDA GALLO	“El Gallo” Wastewater Treatment Plant effluent
400	CARCAMO EL CIPRES	“El Naranjo” Wastewater Treatment Plant influent
500	SALIDA SAUZAL	“El Sauzal” Wastewater Treatment Plant effluent
600	SALIDA NARANJO	“El Naranjo” Wastewater Treatment Plant effluent
700	CARCAMO BUCANEROS	Pump Station feeding El Gallo & El Naranjo WWTP
800	CARCAMO ESMERALDA	Pump Station feeding El Gallo & El Naranjo WWTP
900	CARCAMO DIAMANTE	Pump Station feeding El Gallo & El Naranjo WWTP
1000	CARCAMO 11 Y GUADALUPE	Pump Station feeding El Gallo & El Naranjo WWTP
1100	LECHERIA AZUCENA	Dairy Plant Effluent
1200	CARCAMO CASTILLO	Pump Station feeding El Gallo & El Naranjo WWTP
1300	JEM EQUIPMENT	Clothing tinting industry effluent
1400	ALIMENTOS CONCENTRADOS	Fish-flour processing effluent
1500	POZO DE VISITA DEL BOLICHE	Interceptor; residential with some industrial
1600	POZO DE VISITA DE HERDEZ	Sauce processing plant effluent
1700	POZO DE VISITA CALLE PEDRO LOYOLA	Interceptor: residential and industrial





RESULTS

The analytical results are shown in two sections. First the field data for each site is listed by sampling date. Then all of the laboratory results are listed by analyte for each site.

